

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1 Claim 1 (currently amended): A quantum semiconductor device comprising:

2 a first semiconductor layer formed ~~[[on]]~~ over a substrate and having a two-dimensional
3 carrier gas formed in;

4 a quantum dot formed ~~[[on]]~~ over the first semiconductor layer;

5 a second semiconductor layer formed ~~[[on]]~~ over the first semiconductor layer, ~~covering~~
6 burying the quantum dot;

7 a dot-shaped structure formed on the surface of the second semiconductor layer at a position
8 above the quantum dot; and

9 ~~[[an]] oxide layer~~ layers formed on ~~[[two]]~~ both sides of the dot-shaped structure on the upper
10 surface of the second semiconductor layer.

1 Claim 2 (original): A quantum semiconductor device according to claim 1, wherein

2 the dot-shaped structure is caused to form on the surface of the second semiconductor layer
3 at a position above the quantum dot due to crystal strains generated in the surface of the second
4 semiconductor layer due to the presence of the quantum dot.

1 Claim 3 (original): A quantum semiconductor device according to claim 1, wherein
2 the quantum dot is in a three-dimensionally grown island self-assembled by S-K mode.

1 Claim 4 (original): A quantum semiconductor device according to claim 1, wherein
2 the dot-shaped structure is in a three-dimensionally grown island self-assembled by S-K
3 mode.

1 Claim 5 (original): A quantum semiconductor device according to claim 1, wherein
2 a depletion region is formed due to the presence of the oxide layer in a region of the first
3 semiconductor layer, which is below the oxide layer, and
4 a channel region is defined by the depletion region.

1 Claim 6 (original): A quantum semiconductor device according to claim 5, further
2 comprising:
3 source/drain regions connected to both ends of the channel region.

1 Claim 7 (original): A quantum semiconductor device according to claim 1, further
2 comprising:
3 a gate electrode connected to the dot-shaped structure.

1 Claim 8 (original): A quantum semiconductor device according to claim 1, wherein
2 a distance between the two-dimensional carrier gas and the quantum dot is 5 nm or less.

1 Claim 9 (original): A quantum semiconductor device according to claim 1, wherein
2 the dot-shaped structure is in another quantum dot or an anti-dot.

1 Claim 10 (original): A quantum semiconductor device according to claim 1, wherein
2 at least a part of the dot-shaped structure is oxidized.

1 Claim 11 (currently amended): A method for fabricating a quantum semiconductor device
2 comprising the steps of:

3 forming ~~[[on]]~~ over a substrate a first semiconductor layer with a two-dimensional carrier gas
4 formed in;

5 forming a quantum dot ~~[[on]]~~ over the first semiconductor layer;

6 forming a second semiconductor layer, ~~covering~~ burying the quantum dot;

7 forming a dot-shaped structure on the surface of the second semiconductor at a position
8 above the quantum dot due to strains generated in the surface of the second semiconductor layer due
9 to the presence of the quantum dot; and

10 forming ~~[[an]]~~ oxide ~~layer~~ layers on the upper surface of the second semiconductor layer on
11 both side of the dot-shaped structure with the dot-shaped structure as a mark.

1 Claim 12 (withdrawn): A method for fabricating a quantum semiconductor device according
2 to claim 11, further comprising, after the step of forming the oxide layer,
3 the step of forming source/drain regions with the oxide layer as a mark.

1 Claim 13 (withdrawn): A method for fabricating a quantum semiconductor device according
2 to claim 11, wherein
3 in the step of forming the quantum dot, the quantum dot in a three-dimensional grown island
4 is self-assembled by S-K mode.

1 Claim 14 (withdrawn): A method for fabricating a quantum semiconductor device according
2 to claim 11, wherein
3 in the step of forming the dot-shaped structure, the dot-shaped structure in a
4 three-dimensional grown island is self-assembled by S-K mode.

1 Claim 15 (withdrawn): A method for fabricating a quantum semiconductor device according
2 to claim 11, wherein
3 in the step of forming an oxide layer, the oxide layer is formed by bringing a needle-shaped
4 conductor close to the surface of the second semiconductor layer and applying a voltage between the
5 needle-shaped conductor and the substrate.

U.S. Patent Application Serial No. **10/781,684**
Amendment filed May 12, 2005
Reply to OA dated January 12, 2005

1 Claim 16 (withdrawn): A method for fabricating a quantum semiconductor device according
2 to claim 15, wherein
3 the needle-shaped conductor is a probe of an atomic force microscope.